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Deborah T. Tomme
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT application of:)
Shunpei YAMAZAKI et al.)
Serial No. 08/183,800) Examiner S. Crane
Filed: January 21, 1994) Art Unit: 2508
For: SEMICONDUCTOR MATERIAL)
AND METHOD FOR FORMING)
THE SAME AND THIN FILM)
TRANSISTOR) March 14, 1997

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RESPONSE

GROUP 2500

Honorable Assistant Commissioner for Patents

Washington, D.C. 20231

Sir:

The Office Action of November 14, 1996 was received and carefully reviewed. Reconsideration and withdrawal of the currently pending rejections are requested for the reasons advanced in detail below. Claims 23-38 remain pending in the instant application.

Applicants also submit herewith a *Petition for One-Month Extension of Time*. This should render the instant response timely filed.

Claims 23-38 are rejected under 35 U.S.C. §103(a) as being unpatentable over Yamazaki, 5,262,654, and Zhang et al., 5,313,075. This rejection is traversed.

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Specifically, the instant application has a priority date of, at least, March 18, 1991, which is prior to the U.S. filing dates attributable to both

the Zhang et al. patent (May 22, 1991) and the Yamazaki patent (November 15, 1991).¹ Consequently, an English translation of the priority document is being filed herewith to remove these patents as references against the instant application, and, thus, overcome the above-noted rejection. This Verified Translation was filed in the divisional of the instant application, namely, Serial No. 08/396,780, which was brought to the Examiner's attention in this case on April 30, 1996.

Claims 23-38 are also rejected under the judicially created doctrine of obviousness-type double patenting over claims 1-21 of U.S. Patent No. 5,313,075 or claims 1-14 of U.S. Patent No. 5,262,654. These claims do not recite the specific concentrations of oxygen, carbon or nitrogen, as discussed in greater detail in Applicant's prior Amendments, incorporated herein by reference. As a result, Applicants contend that this rejection is likewise overcome.

Specifically, the present invention, as recited in amended claims 23, 25, 27, 32, 33, 34, 35, 36, 37 and 38, is directed to a thin film transistor comprising a semiconductor layer, wherein the semiconductor layer contains oxygen, nitrogen or carbon at a concentration of 1×10^{19} atoms/cm³. The semiconductor layer having the above-noted concentration of oxygen, nitrogen or carbon may also be formed by a process of the forming the semiconductor film having 1×10^{19} atoms/cm³ or less and then irradiating the entire film with a laser to increase the crystallinity of the film.

As provided on page 7 of the specification, the reduction of oxygen, nitrogen or carbon significantly increases the electron mobility by laser


¹The priority date of the instant application could actually be claimed to August 2, 1985 or August 23, 1985, as provided by the Amendment and Declaration filed on April 30, 1996. Since the U.S. filing dates of the cited references, however, are subsequent to the March 18, 1991 priority date and a Verified Translation of this priority application was already available, Applicants are asserting this particular priority date.

annealing. For example, an electron mobility as high as $1000 \text{ cm}^2/\text{Vs}$ was obtained by controlling the oxygen, as well as the carbon and nitrogen concentrations.

Neither Yamazaki or Zhang et al. recite in the respective claims provided therein a semiconductor layer having oxygen, nitrogen, or carbon at a specific concentration or less. The concentration limitation of the currently pending claims patentably distinguishes them over the claims of the Zhang et al. and Yamazaki patents and, thus, this rejection should likewise be overcome. Consequently, claims 23, 25, 27, 32, 33, 34, 35, 36, 37 and 38, as well as the claims depending therefrom, should be considered allowable.

In view of the foregoing, it is respectfully requested that the rejections of record be reconsidered and withdrawn by the Examiner, that claims 23-38 be allowed and that the application be passed to issue. If the Examiner believes a conference would be of benefit in expediting the prosecution of the instant application, she is hereby invited to telephone counsel to arrange such a conference.

Respectfully submitted,



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